

participatory approach to income generation. In one case the participating families decided to start keeping hens and selling eggs. The discount supermarket Aldi Süd buys organic black tiger shrimps in West Bengal and as part of the develoPPP project mentioned above it has funded extensive afforestation that is combined with income-generating activities. Between 2017 and 2021 areas totalling some 40 hectares have been afforested at two sites, in each case with the involvement of a local women's group. The women's groups were trained and provided with necessary equipment to enable them not only to keep hens for egg production but also to run their own replacement breeding. Solar-powered incubators for the hens' eggs were purchased for this purpose. Previously the women had to buy the chicks they were going to rear.

### Integrated mangrove aquaculture

As another aspect of the Aldi Süd project, three pilot farms for integrated mangrove aquaculture (IMA) were set up in West Bengal. This has involved the NGO NEWS and the organic shrimp producer Blue Sea Aquaculture, which is based in Calcutta, incorporating more than ten hectares of mangroves into existing organic shrimp ponds. This form of production, which was previously unknown in India, has great potential – especially for regions that will be particularly affected by sea-level rise over the

next 50 years. Integrating mangroves will help stabilise pond dams, increase biodiversity, alter the microclimate and bind carbon. Above all, though, the mangroves in the scheme developed by bluesensus and NEWS will also improve the living and growing conditions for shrimps, fish and crabs in the ponds. As yet this is a pilot project that still needs to be refined and scientifically monitored.

### Systematic expansion of the initiatives is envisaged

In India and Costa Rica functioning structures have been established that enable the initiated projects to be implemented quickly and thus contribute to the mitigation of global warming. In India the search is under way for partners who are interested in investing in the further development of integrated mangrove aquaculture. In Costa Rica the aim is to restore the 2,000 hectares of mangrove fern as an intact mangrove ecosystem as quickly as possible. Further supporting research is also needed to help with issues such as exact measurement of carbon storage at the individual sites.

The seafood sector, which deals in products from tropical brackish water aquaculture and thus often has a direct connection with mangrove ecosystems, is an obvious candidate for such involvement. Bluesensus and the German NGO Global Nature Fund are currently de-



Women's group involved in extensive afforestation in West Bengal.

Photo: Sourabh Dubey

veloping a scheme that will give the seafood sector a very easy means of participating in the financing of restoration measures (see also following article). If all Germany's sellers of organic shrimps were to adopt the Alnatura model, this could make a significant contribution to climate change mitigation and help improve the living conditions of many people on the brink of poverty.

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## A multi-stakeholder partnership for integrated mangrove aquaculture in the Sundarbans

Shrimp farming often involves the felling of valuable mangrove forests. Through the Sustainable Aquaculture in Mangrove Ecosystems (SAIME) project, the Global Nature Fund and partner organisations in India and Bangladesh aim to halt the loss of these valuable ecosystems while securing the livelihoods of small-scale aquaculture farmers.

### By Ralph Dejas

More than a third of all mangrove stands in the world's tropical coastal regions have been lost since the 1980s. This means that the habitats of these salt-tolerant plants are shrinking three to five times faster than tropical rainforests or coral reefs. These valuable coastal ecosystems are being deforested for firewood and settlement, but more than half of the cleared area is being used for new aquaculture ponds. In many of the world's coastal regions, prawn and shrimp farmers are felling mangrove forests because species-rich river deltas are perfectly

suitable to aquaculture of the tasty crustaceans. The aquaculture market segment has grown dramatically in recent years. Seafood produced in various forms of pond farming, in net cages or in other closed-circuit systems now accounts for more than a third of the global seafood market. Global consumption of fish and seafood now averages 20 kilos per person per year, and the figure is rising. While sustainable aquaculture presents opportunities to use controllable production to combat the overfishing of the world's oceans, the drawbacks of

inappropriate methods are obvious: fish meal used as feed in aquaculture systems contributes directly to overfishing. Often, too, the breeding ponds are over-fertilised and polluted with antibiotics.

The Sundarbans (the word is Bengali for "beautiful forests") are the largest contiguous mangrove area in the world, yet they are under severe threat. This unique ecosystem extends from the east coast of India to Bangladesh. The area, the home of the last wild

Bengal tigers, is under great pressure from intensive shrimp farming. The Global Nature Fund (GNF) has been involved in mangrove conservation in Asia since 2005 and has been active in the Sundarbans region since 2018. In the Sustainable Aquaculture in Mangrove Ecosystems (SAIME) project, a multi-stakeholder partnership, the GNF is working with two local environmental organisations – the Nature Environment & Wildlife Society of India (NEWS) and the Bangladesh Environment and Development Society (BEDS) – and with Naturland, Germany's largest internationally active organic agriculture association with extensive aquaculture expertise. Together these organisations are developing approaches to the sustainable conservation of mangrove ecosystems in aquaculture landscapes. SAIME also receives professional advice via a supportive working group comprising experts from the Leibnitz Centre for Tropical Marine Research (ZMT) in Bremen, Germany, the food trade and a consultancy company (bluesensus) that specialises in the sustainable seafood business. The project region has an important light-house function: almost 85 per cent of global shrimp production is based in Asia, much of it in India and Bangladesh.

### Win-win for people and nature

On 40 model farms in the Sundarbans the partners are pursuing a methodological approach that complies with one of the basic principles of the Global Nature Fund's work at the interface of environmental protection and development cooperation: nature-based solutions. Instead of turning to complicated technology that is often hard to install, use and maintain in more remote parts of the world, the project relies on simple yet innovative methods that use what nature itself provides. For the SAIME project this means helping the pilot farms establish what is known as Integrated Mangrove Aquaculture (IMA). In IMA the farmers plant mangrove seedlings directly in the breeding ponds in order to combine shrimp farming with mangrove conservation. This enables a variety of synergies to be exploited: the mangrove trees stabilise the dams, protect the ponds from floods and provide shade. The shrimps thrive in the roots and feed on fallen leaves. In addition, biodiversity on the pilot farms increases, and the farms serve as a place of inspiration and training for other farmers in the surrounding area, so that knowledge of this practical and functional method is passed on. The aim is to replant mangroves on damaged coastal strips, which will thus be stabilised in a way that is compatible with shrimp farming. In

India alone, the 40 partner farms in the project have already planted more than 6,000 trees in 2019 and 2020, the first two years of the project. The seedlings are grown in tree nurseries that were set up as part of the project and are managed by women. By the end of 2021 more than 100,000 mangrove seedlings had been produced in the project region.

The purpose of the project is not to expand shrimp farming in the partner regions but to put it on a sustainable footing while at the same time creating sustainable livelihoods for the shrimp farmers. It therefore started with awareness-raising campaigns on sustainable aquaculture by the partner organisations NEWS and BEDS. Interested shrimp producers then made their farms available as pilot sites. The partner organisations are also training the shrimp farmers in sustainable aquaculture and training the women in the tree nurseries. The shrimp farmers receive the mangrove seedlings free of charge; the cost – and the women's income – is funded by the project. The shrimps are currently being sold via local markets. In Bangladesh a cooperative has been formed and a cooperative building erected. This serves as a training facility and also as a contact point for the farmers, giving them the opportunity to pool their harvests. To facilitate this, there are also plans to erect a cold store. The long-term aim is to achieve organic certification for the farmers via a group certification scheme, so that they can obtain higher prices for their shrimps.

### Consumers and retailers have a part to play

Farmed shrimps are an important export product for India and Bangladesh and they provide a livelihood for many people in the project region. In view of the need to strike a balance between social and humanitarian considerations on the one hand and environmental concerns on the other, it makes more sense to encourage an innovative nature-based solution – such as Integrated Mangrove Aquaculture – rather than simply criticise aquaculture for its adverse impact on mangrove forests. But it is also important not to dismiss the problem as a matter for southern Asia to deal with: via the decisions that we make as consumers, we Eu-



The tree nurseries are managed by women.

Photo: Ralph Dejas/ GNF

ropeans are partly responsible for the way in which shrimps are produced in other parts of the world. In consequence, one of SAIME's key objectives is to improve the small-scale farmers' access to the market and achieve positive impacts on the supply chains. The project therefore involves the German retail trade and informs consumers about the social and environmental benefits of sustainably produced shrimps. The example of Alnatura, one of the largest organic food retailers in Germany, shows that this can work well (see article on page 26).

The SAIME project runs initially until March 2023. It is funded by the German Federal Ministry for Economic Cooperation and Development (BMZ), with additional financial support from Daimler Truck AG and Mercedes-Benz AG. The project is already carrying out valuable activities, including capacity-building by local civil-society organisations, linking and strengthening the local smallholder population and creating durable North-South and South-South dialogue structures. There are plans to bring other food retailers on board in addition to Alnatura, so that they can help raise awareness among consumers in the Global North. Because of the coronavirus pandemic, much of the discussion of this issue with food retailers in Germany has so far had to take place remotely. The Food for Biodiversity association, which the Global Nature Fund played a part in founding in March 2021, now brings key stakeholders in the food sector together and engages them in constructive dialogue.

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